



Spatial Variation of Composition and Distribution of Fish in Two Sites on Euphrates River ,Middle of Iraq.

Jasim M. Salman*# Mayson M. Salah* Dhurgham A. Al-Sultany**

* Collage of Science , University of Babylon , Iraq

** Collage of Ecological Sciences , AL-Qasm Green university, Iraq.

Abstract:

The paper deal with composition and distribution of fish in two sites from Euphrates River-middle . of Iraq between Hindiya barrage and AL-Kifll city.

The study carried out monthly sampling from Oct.2009 to Sept.2010.

A total of (1558) individuals belonging to (19) species and (5) families were collected in study periods from study sites .The results showed high number in AL-kifil site (968 fishes)more than AL-Hindia barrage.(590 fishes).Most abundance species due to the family cyprinodae (15 species) .The species recorded in study area range between rare species (*Alburnus caeruleus*,*Mystus pelusius*)and dominate species such as (*Barbus luteus*;*Crassius auratus*; *Cyprinus carpio* and *Liza abu*).The highest values of diversity corresponding to the samples from station 1. The differences in the species richness , relative abundance ,and mean fish weight were also indicative of distinctive characteristics between these fish assemblages in study area.

Key word ,Fish ,diversity ,distribution ,dominant species ,Euphrates river

1- Introduction

Biodiversity is important for the sustainability of aquatic natural resources and very necessary of ecosystem integrated (Hiddink , *et.al.*, 2006) . There are a variation in spatial and temporal and aquatic community , as a result of differences in habitat structure and source availability (Grenouillet , *et.al.*, 2002) . Fish communities have used to detect river impairment because they are sensitive to arrange of biological physical and chemical disturbances (Karr , 1981) , the data on fish diversity ,spatial distribution and abundance are important for understanding and determining community assessing fishery resources.(Jones , *et al.*,2008)

#Corresponding Author : alshammary2013@yahoo.com

Fish species richness pattern has been effected by physical factors such as nutrient state , and temperature (Zambrano , *et.al.*, 2006)

A high genetic diversity within a fish population may protect it against environmental stressors such as climate change , habitat loss , invasive species ,

eutrophication and pollution may be due to declines and inhibit, and any changes in the composition of fish over time may be helped determined the effect of fish species and provide useful management experiments and associated management activities.(Russ *et al.*,2005 and McClanahan *et al.*,2010) . Many studies deal with fish community structure and biodiversity indices (Suarez and Junior , 2007 ; Zambrano , *et.al.*, 2006 ; Jakson , *et.al.*, 2001 ; Drake and Pereira , 2002 ; Joy and Death , 2001 ; Toham and Teugels , 1999) . in this field Rainer (1981) referee to the analysis of community structure may be use as a good indicator of ecological variation and explain the native and alliance species in this community .

This study aims to explain distribution and abundance of fish in two sites Euphrates River based Al-Hindiya barrage and Kifel city middle of Iraq , and their biodiversity .

2- Materials and Methods

Two sampling sites were selected in Euphrates river ,middle of Iraq (Al-Hindiya barrage and Al-Kifel city) Fig.(1).The distance between study sites was 70 km , The *Phragmites australis* and *Ceratophyllum demersum* were dominant . Fish samples from study sites were collected monthly (Oct.2009 to Spt.2010) by nylon gill nets with different mesh size ; fish species were identification according to (Coad,1991).

List of species ;number of individual and relative abundance in study sites are calculated according to (Odum , 1970) . species richness (Margalef,1968) ; Shanon –weaver index (H)(Shanon-weaver,1949) were studied also.

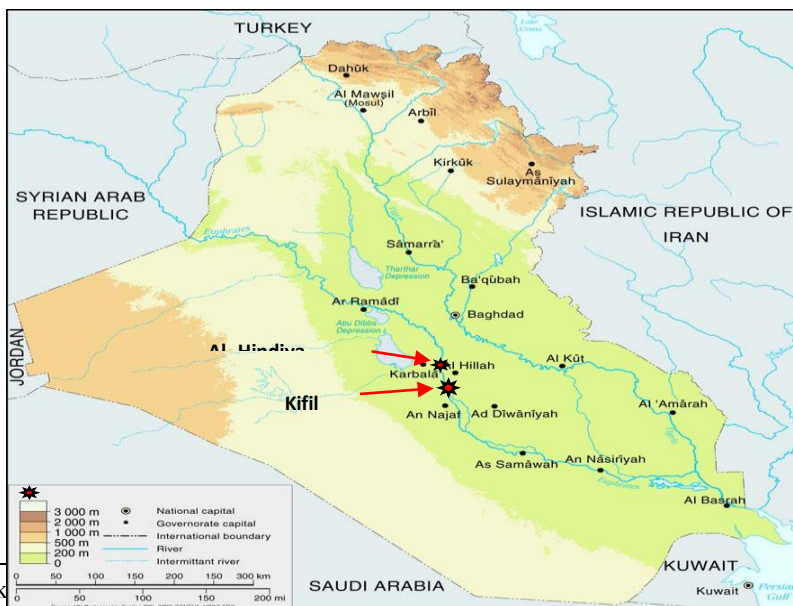


Fig.(1) :Map showed the study sites on Euphrates river, middle of Iraq.

3- Results and Discussion

Fish species and number of individuals in study sites listed in Tables (1 , 2 , 3) , A total of 1561 individuals representing (19) species was recorded, 15 species were from family of Cyprinidae. Relative abundance varied between 0.26% (*Alburnus caeruleus* , *Barbus grypus*) To 26.1% (*Liza abu*) may be due to increase organic detritus in study sites and high tolerance of species *Liza abu* to disturbance of environmental characteristics in river ,also may be to high competition with other species (ARD , 2006) .

The results showed that monthly variation in number of species at both stations , the highest total number was recorded during May 2010 (166 ind.) While the lowest number was recorded during Des. 2009.

As so as the high number of individual recorded at St. 2 (968 ind.) while lower number of individual found in St.1 (590 ind.) , this variation may be because low concentrations of pollutants are high density of planktons in site (2) from Euphrates river and abundance of aquatic plant (Zambrano , *et.al.*, 2006).

The result explain the effect of seasons on number and distributed of fish species in study area . Number of fish were higher in St. 2 recorded in march ,2010 (113 indi.) but higher number in St. 1 were recorded in Apr., 2010 (68 indi.) , because changing habitat conditions that occur with seasonal and other longer term hydrological fluctuations (Henery and Chang , 2011) .

The study showed different types of dominant species in two study sites, (table 3) , varied between rare species (*Alburnus caeruleus* ; *Barbus xanthoptres* ; *Cyprinus tenuiradus* ; *Mystus pelusius*) , To dominant species (*Barbus luteus* , *Crassius auratus* ; *Cyprinus carpio* , *Liza abu*) , May be because present Carnivores that eat on the larva catfish sotl (Moerke and Lambert , 2003) . The structure of a fish community is influenced on a local scale by water depth , current velocity , size of substrate particles , cover and temperature (Rabein and Jacobson , 1993) , also may alter biological interaction , anthropogenic activities sauh as channelization , physical features , which may affect the abundance and distribution of fishe (Jones , 1975) .

The results showed that highs variation in length and weight of recorded species , among the mean length ranged between 12 – 28 cm as lower length of species *Cyprinus tenuiradus* and higher length (24 – 34)cm of species *Silurus triostegus* , in both study sites , but weight ranged between (19.58 g) of species *Cyprinus tenuiradus* and (263.7 g) of species *Silurus triostegus* , Moreover , these differences may be influenced by the some ecological parameter such as water quality , food availability , abundance of predator , feeding type (Moranta , *et.al.*, 1998 ; Callaway , *et.al.*, 2002) , also The maximum biomass values were

differ according to depth and slope of water body , the middle slope may be due to increase in fish size rather than an overall increase in number (Massuti , *et.al.*, 1996) .

In this study , the percentage obtund for small and large sized fish were lowest abundance , but middle sized species (*Barbus luteus* , *Carassius auratus* and *Cyprinus carpio*) reach their highest abundance smaller species *Liza abu* which is dominant in all study area , where food trophic availability is presumable greater (Stefanescu , *et.al.*, 1993) . Fish biomass are positively related to the volume of deep water and habitat in stream and River (Moerke and Lamberti , 2003) , the weights of fish were use assumed as a better indicator of the importance of this trophic category (Suarez *et al.*,2004).

The results showed that highs species richness in two sites of study , (St. 1 6.49 and St. 2 6.04 , species richness decreased progressively throughout the whole depth ranged surveyed (Moranta , *et.al.*, 1998) ; Sediment Parameter , bottom temperature and fishing effort were all closely correlated with species richness (Callaway , *et.al.*, 2002) .

The study showed highest values of diversity corresponded to the samples from calculated of Shannon-wever (\tilde{H}) , The value of (\tilde{H}) varied between 1.07 and 1.03 respectively in study sites ; the results showed low value of evenness index (0.84) in St.1 and (0.81) in St.2 (table 4) . These results may be due to high abundance of some species and stability of river ecosystem (Suarez , *et.al.*, 2004) . Many factors play important role in diversity and evenness of fish community such as macrophyte cover (Pihl , *et.al.*, 1994) , biotic pressures (Competition & Predation) and habitat heterogeneity (Suarez , *et.al.*, 2004 ; Suarez and Junior , 2007) .

Table (1): List of species ;Total Number of individual ; Relative abundance , length and weight of Fish collected in Euphrates River
(First line: average, Second line :mean)

Family	Species	No. (individual)	Relative Abundance(%)	Length (cm)	Weight (g)
Cyprinidae	<i>Alburnus caeruleus</i> (Heckel)	4	0.26	13.8-17.6 15.2	26.7-37.2 30.07
	<i>Aspius vorax</i> (Heckel)	150	9.6	14.8 -76.5 24.82	25.1-216.9 59.66
	<i>Barbus barbulus</i> (Heckel)	7	0.45	17.2-23.1 20.24	35.4-50.2 43.52
	<i>Barbus grypus</i> (Heckel)	4	0.26	19.3-23.7 22.64	20.1-71.8 52.69
	<i>Barbus luteus</i> (Heckel)	316	20.3	9.5-24.6 17.09	25.1-96.8 61.14
	<i>Barbus sharpeyi</i> (Gunther)	12	0.8	12.7-21.4 16.32	15.7-130 42.44
	<i>Barbus xanthopterus</i> (Heckel)	12	0.8	16.1-31.1 26.38	37.1-197 66.29
	<i>Carassius auratus</i> (Linnaeus)	279	17.9	10.9-29.6 17.08	19.7-123.7 68.11



	<i>Chondrostoma regium</i> (Heckel)	13	0.83	8.5-20.4 15.06	13.1-70.2 33.97
	<i>Cyprinion macrostomum</i> (Heckel)	15	0.97	12.4-18.4 14.35	13.8-35.1 24.24
	<i>Cyprinion tenuiradus</i> (Heckel)	7	0.45	9.1-14.6 12.28	12.8-29.5 19.58
	<i>Cyprinus carpio</i> (Linnaeus)	259	16.6	11.7-19.9 16.05	23.7-86.4 52.72
	<i>Garra rufa</i> (Heckel)	21	1.3	12.2-18.4 14.26	15-47.2 25.7
	<i>Alburnus pallidus</i> (Heckel)	11	0.7	9.7-17.5 15.51	16.4-38.4 30.01
	<i>Barbus belayewi</i> (Menon)	13	0.83	12.5-19.8 15.58	17.3-34.5 22.41
Mugilidae	<i>Liza abu</i> (Heckel)	409	26.1	9.4-17.5 13.36	9.7-44.6 27.34
Bagridae	<i>Mystus pelusius</i> (Solander)	5	0.3	13.9-17.3 15.89	23.7-35.2 27.52
Siluridae	<i>Silurus triostegus</i> (Heckel)	14	0.9	23.1-42.9 34.24	120-263.7 263.7
Cichlidae	<i>Tilapia zillii</i> (Gervais)	10	0.64	12.8-19.4 16.83	16.4-32.6 32.03
Total			1561		

Table (2) List of species ;Total Number of individual ; Relative abundance , length and weight of Fish collected in station 1 (Hindia barrage) from Euphrates River.

(First line: average, Second line :mean)

Family	Species	No.(Ind.)	Relative Abundance(%)	Length (cm)	Weight (g)	Type of Dominance
Cyprinidae	<i>Alburnus caeruleus</i> (Heckel)	3	0.5	13.8-17.6 15.3	26.7-37.2 31.23	Rare
	<i>Aspius vorax</i> (Heckel)	10	1.7	14.8-33.5 21.63	34.8-98.4 55.83	Present
	<i>Barbus barbulus</i> (Heckel)	5	0.85	17.2-20.6 18.68	35.4-41 39.08	Present
	<i>Barbus grypus</i> (Heckel)	1	0.17	23.7 23.7	59.5 59.5	Rare
	<i>Barbus luteus</i> (Heckel)	118	20	9.5-24.6 16.98	25.1-93.7 59.85	Dominant
	<i>Barbus sharpeyi</i> (Gunther)	5	0.85	12.7-21.4 17.24	15.7-60.7 41.18	Present
	<i>Barbus xanthopterus</i> (Heckel)	4	0.68	20.-31.1 24.25	41.7-81 55.175	Rare
	<i>Carassius auratus</i> (Linnaeus)	120	20.3	10.9-23.4 17.1	20.5-113.5 68.5	Dominant
	<i>Chondrostoma regium</i> (Heckel)	4	0.68	13.7-14.9 14.27	25.9-28.4 27	Rare
	<i>Cyprinion macrostomum</i> (Heckel)	5	0.85	12.4-16.2 14.3	13.8-35.1 25.86	Present
	<i>Cyprinion tenuiradus</i> (Heckel)	3	0.51	9.1-14.6 12.4	12.8-29.5 20.07	Rare



	<i>Cyprinus carpio</i> (Linnaeus)	122	20.7	12.1-19.9 16.27	27.9-78.6 53.5	Dominant
	<i>Garra rufa</i> (Heckel)	6	1	12.4-18.2 13.93	15-42.9 22.5	Present
	<i>Alburnus pallidus</i> (Heckel)	3	0.51	9.7-17.5 14.9	16.4-34.8 28.43	Rare
	<i>Barbus belayewi</i> (Menon)	3	0.51	12.5-18.9 16.03	18.4- 34.523.83	Rare
Mugilidae	<i>Liza abu</i> (Heckel)	158	26.8	9.4-17.5 13.35	9.7-44.1 28.99	Dominant
Bagridae	<i>Mystus pelusius</i> (Solander)	4	0.68	13.9-16.8 15.48	28.6-35.2 31.33	Rare
Siluridae	<i>Silurus triostegus</i> (Heckel)	8	1.4	23.1-42.9 33.76	120-310.5 220.39	Present
Cichlidae	<i>Tilapia zillii</i> (Gervais)	8	1.4	12.8-17.5 14.5	16.4-42.6 29.06	Present
Total		590				

Table (3) List of species; Total Number of individual ; Relative abundance , length and weight of Fish collected from station 2 (Kifil city) from Euphrates River. (First line: average, Second line :mean)

Family	Species	No. (Ind.)	Relative Abundance(%)	Length (cm)	Weight (g)	Type of Dominance
Cyprinidae	<i>Alburnus caeruleus</i> (Heckel)	1	0.1	15.1 15.1	28.9 28.9	Rare
	<i>Aspius vorax</i> (Heckel)	140	14.5	28 18.1-76.5	25.1-216.9 63.48	Dominant
	<i>Barbus barbulus</i> (Heckel)	2	0.21	20.5-23.1 21.8	45.7-50.2 47.95	Rare
	<i>Barbus grypus</i> (Heckel)	3	0.31	19.3-22.8 21.57	20.1-71.8 45.87	Rare
	<i>Barbus luteus</i> (Heckel)	198	20.5	12.8-22.8 17.2	29.4-96.8 62.42	Dominant
	<i>Barbus sharpeyi</i> (Gunther)	7	0.7	13.6-20.2 15.4	21.9 -130 43.7	Present
	<i>Barbus xanthopterus</i> (Heckel)	8	0.83	16.1-28.1 28.5	37.1-197 77.39	Present
	<i>Carassius auratus</i> (Linnaeus)	159	16.4	11.8-29.6 17.05	19.7-123.7 67.71	Dominant
	<i>Chondrostoma regium</i> (Heckel)	9	0.93	8.5-20.4 15.85	13.1-70.2 40.93	Rare
	<i>Cyprinion macrostomum</i> (Heckel)	10	1.3	12.5-18.4 14.4	17.3-29.1 22.62	Present
	<i>Cyprinion tenuiradus</i> (Heckel)	4	0.4	11.3-13.4 12.15	17.5-20.8 19.075	Rare
	<i>Cyprinus carpio</i> (Linnaeus)	137	14.2	11.7 -19.8 15.82	23.7-86.4 51.925	Dominant
	<i>Garra rufa</i> (Heckel)	15	1.5	12.2-18.4 14.59	18.2-47.2 28.9	Present
	<i>Alburnus pallidus</i> (Heckel)	8	0.83	14.2-17.5 16.11	22.7-38.4 31.59	Rare

	<i>Barbus belayewi</i> (Menon)	10	1.3	12.6-19.8 15.12	17.3-27.5 20.98	Present
Mugilidae	<i>Liza abu</i> (Heckel)	248	25.6	10.4-16.9 13.36	12.4-44.6 25.69	Dominant
Bagridae	<i>Mystus pelusius</i> (Solander)	1	0.1	17.3 17.3	23.7 23.7	Rare

SITE	SPECIES RICHNESS	(H) INDEX	EVINNESS INDEX
S1	6.49	1.07	0.84
S2	6.04	1.03	0.81

Siluridae	<i>Silurus triostegus</i> (Heckel)	6	0.62	29.2-37.5 34.72	193-370 307	Present
Cichlidae	<i>Tilapia zillii</i> (Gervais)	2	0.21	18.9-19.4 19.15	34.7-35.3 35	Rare
Total		968				

Table (4): Species richness ; Shanon –weaver index and Evinness of fish species in study sites on Euphrates river,Iraq.

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